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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/562,154

12/23/2005

Snjezana Boger

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EXAMINER

SHEVIN, MARK L

ART UNIT

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1793

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/562,154	<b>Applicant(s)</b> BOGER ET AL.	
	<b>Examiner</b> Mark L. Shevin	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 20 March 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) 7-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>05/15/2007 and 12/23/2005</u> .                               | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Status***

1. Claims 1-14, filed December 23<sup>rd</sup>, 2005, are pending. Claims 7-14 have been withdrawn as directed to a non-elected invention per the restriction requirement below.

### ***Priority***

2. Applicant's claim to foreign priority of German patent application DE 103 28 745.0, filed June 25<sup>th</sup>, 2003, has been recorded.

### ***Information Disclosure Statements***

3. The information disclosure statements, filed May 15<sup>th</sup>, 2007 and December 23<sup>rd</sup>, 2005 have been recorded.

### ***Restriction***

4. The Examiner notes Applicant's election of Group I, claims 1-6 for prosecution.

### ***Claim Objections***

5. **Claims 2-4** are objected to because of the following informalities: Appropriate correction is required.

In the present instance, Claims 2 and 4 have broad limitations of 0.01 - 10 vol% followed by narrow limitations of 0.1 to 1 vol% introduced by the phrase "in particular." Claim 3 has a broad limitation of transition metals followed by a narrow limitation of metals from groups IV and V introduced by the phrase "preferably."

A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent

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protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949).

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) The invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. **Claim 1** is rejected under 35 U.S.C. 102(b) as being anticipated by or alternatively, under 35 U.S.C. 103(a) as being obvious over **Peng** (CN 1413797 - Abstract).

Peng discloses a method of soldering aluminum and copper pipes together using an active connection agent prepared from nanometer powder which was added to water, organic cellulose, and flux through mixing. Thus nanoparticles are added to a base material to produce a non-corrosion flux.

Assuming arguendo, that nanoparticles are not "added to a base material" to form a flux, it would have obvious to one of ordinary skill in metallurgy, at the time the invention was made, to form such a flux as Peng discloses a flux mixture with nanoparticles mixed into it and the "base material" is the mixture of water, organic cellulose, and flux.

7. **Claims 2-4** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Peng** as applied to claim 1 above, in view of **Ishii** (US 5,916,635).

The disclosure of Peng was discussed in the rejection of claim 1 above, however Peng does not teach the amount of nanoparticles added to the flux or the type of nanoparticles used.

Ishii is drawn to producing hydrophilic coatings for the aluminum fins of heat exchangers (Abstract). Such hydrophilic coatings are used to let condensing water

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spread out over the surface of fins rather than forming globules which increase resistance to air flow and lower heat exchanger efficiency (col. 1, lines 20-35).

Hydrophilic coatings are produced by spreading a mixture of colloidal silica (Silicon dioxide,  $\text{SiO}_2$ ), water-soluble polymers, and anionic surfactants over aluminum fins and drying by heating (col. 3, lines 1-10). The colloidal silica may be alkali-stabilized silica with a particle diameter of 5 to 100 nm, preferably 10 to 30 nm (col. 3, lines 19-25).

The total weight of the polymer and silica nanoparticles in the mixture is 4 to 20 wt% (col. 3, lines 9-10).

Regarding claims 2 and 4, it would have been obvious to one of ordinary skill in the metallurgy arts, at the time the invention was made, taking the disclosures of Peng and Ishii as a whole, to combine Peng in view of Ishii to include from 0.01 to 10 vol% of nanoparticles by weight as Ishii teaches that the total weight of polymer and nanoparticles should be in the range of 4 to 20 wt%, which the Examiner holds would overlap the claimed ranges of 0.01 to 10 vol% when converted to volume percent. MPEP 2144.05, para I states: "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists."

Regarding claim 3, the nanoparticles are silica, which is an oxide of silicon and may also be coated / grafted nanoparticles in the form of alkali-stabilized or acid-stabilized silica sol (col. 3, lines 19-25).

8. **Claims 5-6** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Peng** in view of **Ishii** as applied to claims 2 and 3 above, in further view of **Englert** (EP 1287941 – Derwent abstract and English machine translation).

The disclosures of Peng and Ishii were discussed above, and while Ishii teaches synthetic resins (col. 4, lines 4-10), he also teaches that such polymer components undergo excessive curing and become fragile after heating above 280 °C (col. 7, lines 15-26). Furthermore, neither Peng nor Ishii teaches the composition of the flux.

Englert addresses these deficiencies and is drawn to a flux composition for brazing of aluminum parts (Title and para 0001). The preferred flux is NOCOLOK™ a potassium fluoroaluminate, preferably  $K_{1-3}AlF_{4-6}$  in the form of a eutectic with a melting point of 562-572 °C (Derwent abstract and para 0003). The flux is mixed with a solvent and binder where the binder is a polymer such as polyurethanes, synthetic resins, phthalates, acrylates, vinyl resins, or polyolefins and the binder is present between 0.1 and 25 wt% (Derwent abstract and para 0016 and 0020). Parts coated with such flux are preferably heat exchanges, particularly for motor vehicles (Derwent abstract - use). The flux is applied, dried, and then hard soldering (aka brazing) is conducted by heating to above 450 °C and preferably to above 560 °C (Derwent - preferred method and para 0031). The advantage of using Englert's inventive flux is that it overcomes the problems associated with fluxing of aluminum-based parts for soldering, such as post-fluxing cleaning (Derwent abstract - advantage and para 0006-0008).

Regarding claim 5, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, taking the disclosures of Peng, Ishii and Englert as

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a whole, to combine Peng in view of Ishii and Englert to form a flux with nanoparticles that includes a polymer that can withstand the demands of brazing as Ishii teaches that his polymeric binders will have poor results after heating to normal brazing temperatures and thus one would look to modify Ishii by looking to other polymeric binders for use in a brazing flux composition as taught by Englert. Englert teaches that his flux including polymeric binders is used for brazing of aluminum at temperatures of above 450 °C and preferably above 560 °C.

Regarding claim 6, it would have been further obvious to one of ordinary skill in the art to chose a proven flux for aluminum in Nocolok ( $K_{1-3}AlF_{4-6}$ ) as disclosed by Englert as Englert teaches that his flux for brazing aluminum overcomes the prior art problems associated with fluxing of aluminum based parts for brazing.

### ***Double Patenting***

**9.** The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.



Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

**10. Claims 1 and 3** are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 14-17, and 20 (filed 01/24/2008) of co-pending application 11/996,712. Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following reasons:

Regarding claim 1, '712 discloses a solderable surface (claim 1) of an aluminum or aluminum alloy (claim 20) heat exchanger comprising a layer of flux wherein a solderable layer contains nanoparticles (claim 14) of oxides, oxide hydrates, nitrides and/or carbides (claim 15 and 16) of silicon, boron, transition metals and/or coated/grafted nanoparticles (claim 16). It would have been obvious to one of ordinary skill in metallurgy, at the time the invention was made, to produce a flux containing nanoparticles as '712 implies that the solderable surface of claim 1, which comprises flux, contains nanoparticles and furthermore flux is normally spread onto a metal surface to prepare it for soldering, thus creating a "solderable surface".

Regarding claim 3, '712 discloses nanoparticles of this type in claims 15 and 16.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

**11. Claim 1** is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 14, 24, of US 2008/0038471

(Common inventors and assignee). Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following reasons:

Regarding claim 1, '471 discloses a method of coating workpieces (claim 1) with a raw material containing nanoparticles (claim 14) and a CAB-flux (claim 24). Thus it would have been obvious to one of ordinary skill in metallurgy, at the time the invention was made, to form a flux with nanoparticles added to a base material as '471 discloses a raw material for coating workpieces which contains flux and nanoparticles and flux is as such, used to coat workpieces prior to brazing.

### ***Conclusion***

**12.** The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

**US 3,971,501** (Cooke): Potassium fluoaluminate  $K_3AlF_6$  for brazing aluminum.

**US 5,180,098** (Halstead et al): Brazing aluminum air conditioning condensers

**US 5,616,388** (Tatsuno et al.): Forming hydrophobic coating for Al heat exchanger

**US 5,962,145** (Matsukawa): Aluminum surface treatment for anticorrosion properties

**US 2006/0196579** (Skipor): Co-pending application with flux and metal nanoparticles

**US 2006/0196644** (Boger): Co-pending application regarding coating

**US 2006/0191671** (Boger): Co-pending application regarding coatings

**US 2007/0114011** (Olivier): More information on coating of heat exchangers

**US 2008/0038471** (Boger et al): Double patenting as explained above

-- **Claims 1-6 (All elected) are rejected**  
-- **No claims are allowed**

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The rejections above rely on the references for all the teachings expressed in the text of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the texts of the references. To emphasize certain aspects of the prior art, only specific portions of the texts have been pointed out. Each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

All recited limitations in the instant claims have been met by the rejections as set forth above. Applicant is reminded that when amendment and/or revision is required, applicant should therefore specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588. The examiner can normally be reached on Monday - Thursday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

**/Mark L. Shevin/**

**/Roy King/**

**Supervisory Patent Examiner, Art Unit 1793**

10-562,154

April 5<sup>th</sup>, 2008

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